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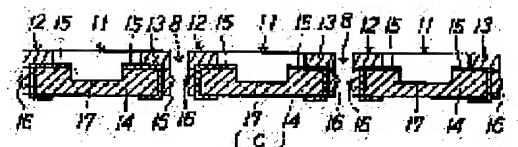
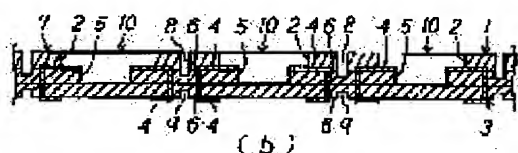
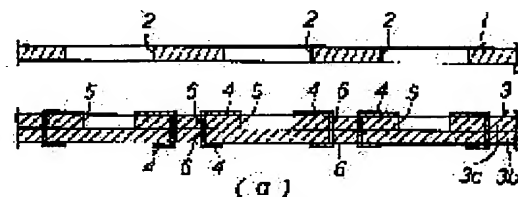
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## (54) MANUFACTURE OF ELECTRONIC COMPONENT MOUNTING PACKAGE

## (57)Abstract:

PROBLEM TO BE SOLVED: To obtain an electronic component housing package the right outer periphery of which can be easily and accurately recognized by a image recognition equipment, even if divided package has a base side with burrs, wherein an electronic component can be mounted and accurately aligned.

SOLUTION: An insulating frame ceramic green sheet 1 and an insulating board ceramic green sheet 3, which is different in color tone from the green sheet 1 after baking and where a metallized paste 4 is printed are prepared and laminated for the formation of a laminate 7, dividing grooves 8 deeper than the thickness of the ceramic green sheet 1 are provided to the upside of the laminate 7 to demarcate it into electronic component housing package regions 10, the laminate 7 is baked and divided along the grooves 8 into electronic component housing packages 11 where a wiring conductor 15 is formed on an insulating base 14, on which an insulating frame 13 of different color tone is laminated. Even if burrs are produced in the periphery of the insulating base 12, the periphery of the insulating frame 13 can be recognized accurately and easily.



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CLAIMS

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[Claim(s)]

[Claim 1] The process which performs predetermined punching processing to a ceramic green sheet, and prepares the ceramic green sheet for insulating frames for it, The process for which the metallizing paste which changes from a metal to the ceramic green sheet with which the color tones after this ceramic green sheet for insulating frames and baking differ is printed to a predetermined pattern, and the ceramic green sheet for insulating substrates is prepared, The process which carries out the laminating of said ceramic green sheet for insulating frames, and said ceramic green sheet for insulating substrates up and down, and obtains a layered product, The process which forms a division slot deeper than the thickness of said ceramic green sheet for insulating frames in the top face of this layered product, and is divided to two or more package fields for electronic-parts receipt, wiring with which the insulating frame with which this layered product is calcinated and color tones differ changes from a metal to the insulating base by which the laminating was carried out -- with the process which obtains the aggregate of the package for electronic-parts receipt with which the conductor was formed The manufacture approach of the package for electronic-parts receipt characterized by providing the process which divides this aggregate along said division slot, and obtains said two or more packages for electronic-parts receipt.

[Claim 2] The process which performs predetermined punching processing to the precursor sheet which mixes inorganic insulating material powder and a thermosetting resin precursor, and changes, and prepares the precursor sheet for insulating frames for it, The process for which the metal paste which mixes metal powder and a thermosetting resin precursor on the precursor sheet with which the color tones after this precursor sheet for insulating frames and heat curing differ, and grows into it is printed to a predetermined pattern, and the precursor sheet for insulating substrates is prepared, The process which carries out the laminating of said precursor sheet for insulating frames, and said precursor sheet for insulating substrates up and down, and obtains a layered product, The process which forms a division slot deeper than the thickness of said precursor sheet for insulating frames in the top face of this layered product, and is divided to two or more package fields for electronic-parts receipt, wiring by which the insulating frame with which this layered product is heated and color tones differ combined said metal powder with the insulating substrate by which the laminating was carried out with thermosetting resin -- with the process which obtains the aggregate of the package for electronic-parts receipt with which the conductor was formed The manufacture approach of the package for electronic-parts receipt characterized by providing the process which divides this aggregate along said division slot, and obtains said two or more packages for electronic-parts receipt.

[Claim 3] L\* a\* b\* of the convention of the color difference of said insulating frame and said insulating substrate to JIS-Z -8730 The manufacture approach of the package for electronic-parts receipt according to claim 1 or 2 characterized by carrying out to five or more by the color difference by the color coordinate system.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] About the package for electronic-parts receipt for holding electronic parts, such as a semiconductor device, and a piezoelectric device, a solid state image pickup device, this invention relates to the package for electronic-parts receipt which divides into each substrate according to the so-called chocolate breaking, and is obtained, after calcinating a picking substrate much in detail.

[0002]

[Description of the Prior Art] Conventionally, about the package for electronic-parts receipt for holding electronic parts, such as semiconductor devices, such as a semiconductor integrated circuit component, and a piezoelectric device, a solid state image pickup device (the so-called CCD) A dimension for example, comparatively about 1cm angle extent and the small package of size On the occasion of the fabrication, if it is a ceramic package While arranging the field used as [ two or more ] the package of a part in the ceramic green sheet layered product of a large area which serves as a substrate of a package after baking and forming in it in one, the division slot divided to each package field is formed in the top face or vertical side of this layered product. By dividing the aggregate of two or more packages which calcinated and obtained this along a division slot (the so-called chocolate breaking), manufacturing many intensively (the so-called many picking) is performed.

[0003] Moreover, when using the insulating material which combined other crystallized glass and inorganic insulating material powder by organic insulation resin as a base ingredient, and a large number carry out chocolate breaking from the sheet-like substrate of picking similarly, manufacturing many packages intensively is performed.

[0004] In such [ on the other hand ] a package for electronic-parts receipt with comparatively small size It faces, although electronic parts are carried in the electronic-parts loading section on the top face of a base of a package using the automatic machine which used image recognition equipment when it carries electronic parts with the need of managing the helicopter loading site with a sufficient precision like especially a solid state image pickup device. Since there are no allowances of a tooth space in a base top face and it is difficult to prepare the recognition mark used as the criteria which carry out alignment of the electronic parts, the image recognition of the periphery of a package is carried out, it considers as the criteria of alignment, and, generally positioning electronic parts based on it is performed.

[0005]

[Problem(s) to be Solved by the Invention] however, with the package obtained by carrying out chocolate breaking along the division slot, the substrate which formed many packages in one as mentioned above Although the periphery of the top face of a base is formed with a sufficient precision of a division slot, in the side face of the base of each package along a division slot, much weld flash with a width of face of about 50 micrometers tends to generate it. Therefore, recognizing as a periphery of the shape of irregularity which contained weld flash as it is going to recognize the periphery of a package with image recognition equipment and a next door, Consequently, the periphery of the package which is the criteria of alignment has not been

recognized to accuracy, but there was a trouble of it becoming impossible to carry electronic parts with a sufficient precision in the right location of the loading section.

[0006] In such a case, the precision top of image recognition equipment was difficult for doubling the focus of image recognition equipment only with the periphery formed with a sufficient precision on the top face of a package, and recognizing the periphery. Moreover, grinding the side face of each package and removing weld flash, after dividing also required time and effort and time amount dramatically, it made manufacture manday increase, was not realistic, and, in the case of the ingredient of a high degree of hardness, was very difficult the base also for the processing technical target like the ceramics.

[0007] This invention is thought out that the above-mentioned trouble should be solved. The object About the manufacture approach of the package for electronic-parts receipt manufactured by carrying out chocolate breaking from the substrate of picking [ much ] Even if the divided package has weld flash on the side face of a base, the right periphery of a package can be easily recognized to accuracy with image recognition equipment. It is in offering the manufacture approach of the package for electronic-parts receipt that the package for electronic-parts receipt which can improve [ precision ] electronic parts alignment and can carry them by that cause can be obtained.

[0008]

[Means for Solving the Problem] The manufacture approach of the 1st package for electronic-parts receipt of this invention The process which performs predetermined punching processing to a ceramic green sheet, and prepares the ceramic green sheet for insulating frames for it, The process for which the metallizing paste which changes from a metal to the ceramic green sheet with which the color tones after this ceramic green sheet for insulating frames and baking differ is printed to a predetermined pattern, and the ceramic green sheet for insulating substrates is prepared, The process which carries out the laminating of said ceramic green sheet for insulating frames, and said ceramic green sheet for insulating substrates up and down, and obtains a layered product, The process which forms a division slot deeper than the thickness of said ceramic green sheet for insulating frames in the top face of this layered product, and is divided to two or more package fields for electronic-parts receipt, wiring with which the insulating frame with which this layered product is calcinated and color tones differ changes from a metal to the insulating base by which the laminating was carried out -- with the process which obtains the aggregate of the package for electronic-parts receipt with which the conductor was formed It is characterized by providing the process which divides this aggregate along said division slot, and obtains said two or more packages for electronic-parts receipt.

[0009] Moreover, the manufacture approach of the 2nd package for electronic-parts receipt of this invention The process which performs predetermined punching processing to the precursor sheet which mixes inorganic insulating material powder and a thermosetting resin precursor, and changes, and prepares the precursor sheet for insulating frames for it, The process for which the metal paste which mixes metal powder and a thermosetting resin precursor on the precursor sheet with which the color tones after this precursor sheet for insulating frames and heat curing differ, and grows into it is printed to a predetermined pattern, and the precursor sheet for insulating substrates is prepared, The process which carries out the laminating of said precursor sheet for insulating frames, and said precursor sheet for insulating substrates up and down, and obtains a layered product, The process which forms a division slot deeper than the thickness of said precursor sheet for insulating frames in the top face of this layered product, and is divided to two or more package fields for electronic-parts receipt, wiring by which the insulating frame with which this layered product is heated and color tones differ combined said metal powder with the insulating substrate by which the laminating was carried out with thermosetting resin -- with the process which obtains the aggregate of the package for electronic-parts receipt with which the conductor was formed It is characterized by providing the process which divides this aggregate along said division slot, and obtains said two or more packages for electronic-parts receipt.

[0010] Moreover, it sets to the above 1st or the 2nd manufacture approach, and the manufacture approach of the package for electronic-parts receipt of this invention is  $L \times a \times b$  of

the convention of the color difference of said insulating frame and said insulating substrate to JIS-Z -8730. It is characterized by carrying out to five or more by the color difference by the color coordinate system.

[0011] According to the manufacture approach of the package for electronic-parts receipt of this invention, the laminating of the ceramic green sheet for insulating frames is carried out on the ceramic green sheet for insulating substrates with which the color tones after this and baking differ. To or the layered product which carried out the laminating of the precursor sheet for insulating frames on the precursor sheet for insulating substrates with which the color tones after this and heat curing differ Form a division slot deeper than the thickness of the ceramic green sheet for insulating frames, or the precursor sheet for insulating frames, and it divides to two or more package fields for electronic-parts receipt. From dividing the aggregate of the package for electronic-parts receipt calcinated, or heated and obtained along a division slot, and obtaining two or more packages for electronic-parts receipt According to the package for electronic-parts receipt with which the insulating frame with which the periphery was fabricated by the division slot at accuracy, and with which an insulating substrate differs from a color tone could obtain the package for electronic-parts receipt by which the laminating was carried out to the top face of an insulating substrate, did in this way, and was obtained Even if much weld flash generated by division exists in the side face of the insulating substrate which constitutes an insulating base It becomes accuracy and the thing which can be recognized easily with image recognition equipment about the periphery of the insulating frame with which a color tone differs from such an insulating substrate, consequently the package for electronic-parts receipt which can improve [ precision ] electronic parts alignment and can carry them can be obtained.

[0012] Moreover, according to the manufacture approach of the package for electronic-parts receipt of this invention, it is  $L^* a^* b^*$  of the convention of the color difference of an insulating frame and an insulating substrate to JIS-Z -8730. When it carries out to five or more by the color difference by the color coordinate system, the difference in the color tone of an insulating frame and an insulating substrate can become a much more suitable thing to distinguish easily and recognize with image recognition equipment, and the periphery of an insulating frame can be recognized more easily and certainly.

[0013]

[Embodiment of the Invention] Next, this invention is explained to a detail based on an attached drawing. Drawing 1 (a) - (c) is the sectional view for every production process showing an example of the gestalt of implementation of the manufacture approach of the package for electronic-parts receipt of this invention, respectively.

[0014] first, wiring with which the laminating of the insulating frame which changes from the ceramic of the insulating substrate and the ceramic from which a color tone differs to the top face of the insulating substrate which consists of a ceramic by the manufacture approach of the package for electronic-parts receipt of this invention is carried out, and it changes from a metal to an insulating substrate — the case where the package for electronic-parts receipt with which the conductor was formed is obtained is explained.

[0015] In this case, as first shown in drawing 1 (a), predetermined punching processing is performed to the ceramic green sheet which serves as an insulating frame after baking, and the ceramic green sheet 1 for insulating frames which formed two or more openings 2 for holding electronic parts inside according to the package field for electronic-parts receipt is prepared. moreover, the ceramic green sheet with which the color tones after this ceramic green sheet 1 for insulating frames and baking differ -- after baking -- wiring -- an insulating substrate and the becoming ceramic green sheet 3 for insulating substrates are prepared after baking which printed two or more metallizing pastes 4 which consist of the metal used as a conductor to the predetermined pattern according to the package field for electronic-parts receipt.

[0016] the opening 5 which serves as a cavity which forms the electronic-parts loading section as a ceramic green sheet 3 for insulating substrates in this example, and wiring — the beer as a conductor — with ceramic green sheet 3a which pierced and processed the breakthrough 6 which forms a conductor The laminating of the ceramic green sheet of two sheets with ceramic green sheet 3b which pierced and processed the breakthrough 6 which forms a conductor is

carried out. the same -- wiring -- the beer as a conductor -- while filling up a breakthrough 6 with the metallizing paste 4 -- the top face of ceramic green sheet 3a, and the underside of ceramic green sheet 3b -- wiring -- the metallizing paste 4 is printed so that it may become the pattern of a conductor.

[0017] Next, as shown in drawing 1 (b), the ceramic green sheet 1 for insulating frames is turned up, the laminating of the ceramic green sheet 1 for insulating frames and the ceramic green sheet 3 for insulating substrates is carried out up and down, and a layered product 7 is obtained. Then, the division slot 8 deeper than the thickness of the ceramic green sheet 1 for insulating frames is formed in the top face of this layered product 7, and it divides to two or more package fields 10 for electronic-parts receipt to which each serves as a package for electronic-parts receipt after baking.

[0018] If the division slot 8 and the opposite part groove 9 shallow in the location which counters are formed also at the ceramic green sheet 3 for insulating substrates which is the underside of a layered product 7 at this time, in case it divides into each package for electronic-parts receipt along the division slot 8 behind, it can divide good.

[0019] Thus, by forming the division slot 8 deeper than the thickness of the ceramic green sheet 1 for insulating frames, the insulating frame after baking becomes that by which that periphery was fabricated with a sufficient precision by the division slot 8 at accuracy, and can be used for the criteria of the alignment of the electronic parts to carry by recognizing this periphery with image recognition equipment.

[0020] next, wiring which changes to the insulating base 12 which this layered product 7 is calcinated, and the laminating of the insulating frame 13 which consists of the ceramic of that insulating substrate 14 and the ceramic from which a color tone differs is carried out to the top face of the insulating substrate 14 which consists of a ceramic, and changes as shown in drawing 1 (c) from a metal -- after obtaining the aggregate of the package 11 for electronic-parts receipt with which a conductor 15 was formed, this aggregate divides along a division slot 8, and two or more packages 11 for electronic-parts receipt obtain.

[0021] Thus, although much weld flash 16 generated according to chocolate breaking will exist in the side face of an insulating substrate 14 among the side faces of an insulating base 12 with the obtained package 11 for electronic-parts receipt It has the periphery on which the insulating frame 13 by which the laminating was carried out on the insulating substrate 14 was fabricated by the division slot 8 at accuracy. Since the color tone of an insulating substrate 13 differs from an insulating substrate 14, the periphery of the insulating frame 13 can be recognized to easy and accuracy with image recognition equipment, without being influenced by existence of weld flash 16. As criteria of alignment, electronic parts can be positioned with a sufficient precision and the periphery can be carried.

[0022] And according to the package 11 for electronic-parts receipt which did in this way and was obtained by the manufacture approach of this invention The loading section 17 of electronic parts is formed in the crevice formed by the opening 5 of the above-mentioned [ center ] almost on top and opening 2 of an insulating base 12. Loading immobilization of the electronic parts (not shown), such as a solid state image pickup device, is carried out through adhesives, such as glass, resin, and wax material, at this loading section 17. By joining a lid (not shown) to the top face of the insulating frame 13 through sealing agents, such as glass, resin, and wax material, and closing electronic parts airtightly inside, it becomes electronic-parts equipment as a product.

[0023] moreover, other examples of a configuration of the package for electronic-parts receipt manufactured by the manufacture approach of the package for electronic-parts receipt of this invention -- drawing 2 (a) - (c) -- a sectional view shows, respectively. In these drawings, the same sign is given to the same part as drawing 1 (c).

[0024] wiring with which so-called axle-pin-rake rhe SHON 18 is formed as an insulating base 12 at the side face of an insulating substrate 14 by carrying out the laminating of the insulating frame 13 with which an insulating substrate 14 differs from a color tone on an insulating substrate 14, and the example of drawing 2 (a) was formed in the insulating substrate 14 -- the side face [ conductor / 15 ] using this axle-pin-rake rhe SHON 18 -- it is the example currently wired through the conductor. and wiring which the electronic parts 19, such as a solid state

image pickup device, were carried in the loading section 17 of the electronic parts formed in the top face of an insulating substrate 14 as a crevice, and has been arranged around electrode [ of the top face ], and loading section 17 -- a conductor 15 is electrically connected using a bonding wire (not shown) etc.

[0025] wiring which axle-pin-rake rhe SHON 20 is formed the laminating of the insulating frame 13 with which an insulating substrate 14 differs from a color tone on an insulating substrate 14 being carried out, and applying the example of drawing 2 (b) as an insulating base 12 to both side faces of the insulating frame 13 and an insulating substrate 14, and was formed in the insulating substrate 14 -- the side face [ conductor / 15 ] using this axle-pin-rake rhe SHON 20 -- it is the example currently wired through the conductor.

[0026] and wiring which the electronic parts 19, such as a solid state image pickup device, were carried in the loading section 17 of the electronic parts formed in the top face of an insulating substrate 14 as a crevice like drawing 2 (a), and has been arranged around electrode [ of the top face ], and loading section 17 -- a conductor 15 is electrically connected using a bonding wire (not shown) etc.

[0027] the \*\* which the laminating of the insulating frame 13 with which an insulating substrate 14 differs from a color tone on an insulating substrate 14 is carried out, and does not establish a crevice in an insulating substrate 14 as an insulating base 12 in the example of drawing 2 (c) -- wiring of the top face which made the center mostly the loading section 21 of electronic parts, and was formed in the insulating substrate 14 -- a conductor 15 -- drawing 1 (c) -- the same -- beer -- it is the example currently wired through the conductor. and wiring which the electronic parts 19, such as a solid state image pickup device, were carried in the loading section 21 of the electronic parts formed in the top face of an insulating substrate 14, and has been arranged near the electrode of the top face, and the loading section 21 circumference -- a conductor 15 is electrically connected using a bonding wire (not shown) etc. moreover -- this example -- wiring of the loading section 21 circumference -- the electrode formed in the underside of electronic parts 19 to the electrode pad which the conductor 15 was made to extend to the field [ directly under ] of electronic parts 19 in the loading section 21, and was connected at this head made to extend or its head -- a bump -- you may carry by the so-called flip chip mounting method which connects electrically through a conductor (not shown).

[0028] The insulating frame 13 and insulating substrate 14 which constitute an insulating base 12 in the package for electronic-parts receipt concerning this invention should just acquire a desired color tone difference by adding various pigments in a ceramic raw material, in order to consist of departments of electric insulation material, such as ceramics, such as a nature sintered compact of an aluminum oxide, a nature sintered compact of aluminum nitride, a nature sintered compact of a mullite, a nature sintered compact of silicon nitride, and nature sintering of silicon carbide, and crystallized glass, and to change the color tone of the insulating frame 13 and an insulating substrate 14.

[0029] What is necessary is just to use this for the manufacture approach of the package for electronic-parts receipt of this invention by obtaining a ceramic green sheet by making this with the shape of a sheet with a well-known doctor blade method conventionally, while carrying out addition mixing of suitable organic binder and solvent for raw material powder, such as an aluminum oxide, oxidization silicon, magnesium oxide, and a calcium oxide, and making with the shape of slurry if it is the case where it consists of the nature sintered compact of an aluminum oxide, for example as a ceramic in the fabrication of the insulating frame 13 and an insulating substrate 14.

[0030] Moreover, in order to change the color tone of a ceramic, when adding a pigment, ceramics, such as black, and brown, blackish brown, can be obtained by addition of these pigments that what is necessary is just to add according to the color tone difference which needs titanium oxide (after baking, \*\*\*\*), molybdenum oxide (ashes - black), chromic oxide (pink - purplish red), cobalt oxide (ashes), nickel oxide (ashes), erbia (pink) NEOJIA (blue), etc.

[0031] wiring -- a conductor 15 makes the operation which is formed and connects the electrode of the electronic parts carried to an external electrical circuit electrically by printing or filling up a predetermined pattern with the metallizing paste which consists of metal powder,



such as tungsten molybdenum manganese, silver, and copper, and calcinating it with the insulating frame 13 and an insulating substrate 14.

[0032] in addition, wiring -- a conductor 15 -- the alloy of a tungsten, molybdenum, or these and manganese, or copper metallizing, when it consists of a conductor If the thickness of about 1-20 micrometers is made to put the metal which is excellent in corrosion resistance, such as nickel metallurgy, on the front face to expose, and is excellent in wettability with solder with plating wiring -- while a conductor 15 can prevent effectively that oxidation corrosion is carried out -- wiring -- the bonding wire connected with a conductor 15 at this, and a bump -- a conductor is connectable with a firm thing. therefore, wiring -- a conductor 15 -- the aforementioned metallizing -- when it consists of a conductor, it is desirable to make the thickness of 1-20 micrometers put metals, such as nickel metallurgy, on the front face to expose with plating.

[0033] next, wiring by which the laminating of the insulating frame from which the insulating substrate and color tone differ by the manufacture approach of the package for electronic-parts receipt of this invention on the top face of the insulating substrate which combined inorganic insulating material powder with thermosetting resin, and which combined inorganic insulating material powder with thermosetting resin was carried out, and it combined metal powder with an insulating substrate with thermosetting resin -- the case where the package for electronic-parts receipt with which a conductor was formed is obtained explains based on drawing 1 like the above-mentioned manufacture approach.

[0034] In this case, after making it heat and harden as first shown in drawing 1 (a), predetermined punching processing is performed to the precursor sheet which mixes the inorganic insulating material powder and thermosetting resin precursor used as an insulating frame, and changes, and the precursor sheet 1 for insulating frames which formed two or more openings 2 for holding electronic parts inside according to the package field for electronic-parts receipt is prepared. moreover, the precursor sheet with which the color tones after this precursor sheet 1 for insulating frames and heating differ -- after heating -- wiring -- an insulating substrate and the becoming precursor sheet 3 for insulating substrates are prepared after heating which printed two or more metal pastes 4 which mix the metal powder and the thermosetting resin precursor used as a conductor, and change to the predetermined pattern according to the package field for electronic-parts receipt.

[0035] the opening 5 which serves as a cavity which forms the electronic-parts loading section as a precursor sheet 3 for insulating substrates in this example, and wiring -- the beer as a conductor -- with precursor sheet 3a which pierced and processed the breakthrough 6 which forms a conductor The laminating of the precursor sheet of two sheets with precursor sheet 3b which pierced and processed the breakthrough 6 which forms a conductor is carried out. the same -- wiring -- the beer as a conductor -- while filling up a breakthrough 6 with the metal paste 4 -- the top face of precursor sheet 3a, and the underside of precursor sheet 3b -- wiring -- the metal paste 4 is printed so that it may become the pattern of a conductor.

[0036] Next, as shown in drawing 1 (b), the precursor sheet 1 for insulating frames is turned up, the laminating of the precursor sheet 1 for insulating frames and the precursor sheet 3 for insulating substrates is carried out up and down, and a layered product 7 is obtained. Then, the division slot 8 deeper than the thickness of the precursor sheet 1 for insulating frames is formed in the top face of this layered product 7, and it divides to two or more package fields 10 for electronic-parts receipt to which each serves as a package for electronic-parts receipt after heating.

[0037] If the division slot 8 and the opposite part groove 9 shallow in the location which counters are formed also at the precursor sheet 3 for insulating substrates which is the underside of a layered product 7 at this time, in case it divides into each package for electronic-parts receipt along the division slot 8 behind, it can divide good.

[0038] Thus, by forming the division slot 8 deeper than the thickness of the precursor sheet 1 for insulating frames, the insulating frame after heating becomes that by which that periphery was fabricated with a sufficient precision by the division slot 8 at accuracy, and can be used for the criteria of the alignment of the electronic parts to carry by recognizing this periphery with image recognition equipment.

[0039] Next, as shown in drawing 1 (c), heat this layered product 7 and that insulating substrate 14 and color tone differ from each other on the top face of the insulating substrate 14 which combined inorganic insulating material powder by heat-curing resin. wiring which combines metal powder by heat-curing resin, and grows into the insulating base 12 of which the laminating of the insulating frame 13 which combined inorganic insulating material powder by heat-curing resin is carried out, and it consists, after obtaining the aggregate of the package 11 for electronic-parts receipt with which the conductor 15 was formed This aggregate is divided along the division slot 8, and two or more packages 11 for electronic-parts receipt are obtained.

[0040] Thus, although much weld flash 16 generated according to chocolate breaking will exist in the side face of an insulating substrate 14 among the side faces of an insulating base 12 with the obtained package 11 for electronic-parts receipt It has the periphery on which the insulating frame 13 by which the laminating was carried out on the insulating substrate 14 was fabricated by the division slot 8 at accuracy. Since the color tone of an insulating substrate 13 differs from an insulating substrate 14, the periphery of the insulating frame 13 can be recognized to easy and accuracy with image recognition equipment, without being influenced by existence of weld flash 16. As criteria of alignment, electronic parts can be positioned with a sufficient precision and the periphery can be carried.

[0041] The insulating frame 13 and insulating substrate 14 which constitute an insulating base 12 in the package for electronic-parts receipt concerning this invention Inorganic insulating material powder, such as oxidization silicon, an aluminum oxide and aluminimum nitride, silicon carbide, barium titanate strontium titanate titanac-acid calcium, and a titanium oxide zeolite, for example, an epoxy resin, polyimide resin, phenol resin, and a thermosetting polyphenylene ether tree It is formed by joining together with thermosetting resin, such as fat, polyimidoamide resin, and bismaleimide triazine resin. What is necessary is just to acquire a desired color tone difference by adding various pigments in the above-mentioned raw material, in order to change the color tone of the insulating frame 13 and an insulating substrate 14.

[0042] The insulating frame 13 and an insulating substrate 14 will be greatly different to the coefficient of thermal expansion of the electronic parts with which the coefficient of thermal expansion is carried as the content of the inorganic insulating material powder contained in these is less than 60 % of the weight. If electronic parts generate heat at the time of actuation and this heat is impressed to both of an insulating substrate 14 especially with electronic parts The big thermal stress resulting from a difference of both coefficient of thermal expansion occurs among both, electronic parts exfoliate from an insulating substrate 14 with this big thermal stress, or there is an inclination which a crack and a chip generate in electronic parts. Moreover, when the content of inorganic insulating material powder exceeds 95 % of the weight, it is in the inclination it to become difficult to combine inorganic insulating material powder firmly by heat-curing resin. Therefore, for the insulating frame 13 and insulating substrate 14 which constitute an insulating base 12, it is this better \*\* to consider as the range whose amounts of the inorganic insulating material powder contained of that interior in each are 60 thru/or 95 % of the weight.

[0043] In the fabrication of such an insulating frame 13 and an insulating substrate 14 For example, particle size is 0.1-100. To the oxidization silicon powder which is mum grade, thermosetting resin precursors, such as the bisphenol A mold epoxy resin, and a bisphenol female mold epoxy resin, a novolak mold epoxy resin, a glycidyl ester mold epoxy resin, And by adopting sheet forming methods, such as a doctor blade method, making the insulating paste which carried out addition mixing and obtained curing agents, such as an amine system curing agent, an imidazole system curing agent, and an acid-anhydride system curing agent, with the shape of a sheet of a semi-hardening condition, and obtaining a precursor sheet What is necessary is just to use this for the manufacture approach of the package for electronic-parts receipt of this invention.

[0044] Moreover, the above-mentioned precursor sheet serves as the insulating frame 13 and insulating substrate 14 which combine inorganic insulating material powder with thermosetting resin, and change by heating and carrying out heat curing at the temperature of about 100 - 300 \*\*.

[0045] Furthermore, these insulation frame 13 and an insulating substrate 14 may be made to blend staple fibers, such as a glass fiber, and carbon fiber, an aramid fiber, an alumina fiber, a potassium titanate whisker boric-acid aluminum whisker, with the above-mentioned ingredient further.

[0046] Moreover, in order to change these color tones, when adding a pigment For example, Phthalocyanine Green (after hardening) Green and Quinacridone MAZENDA (red) thioindigo (red) copper-phthalocyanine-blue (blue) Indus Wren (blue) flavanthrone (yellow) anthra viridin (yellow) anthanthrone (sour orange) pyran TRON (sour orange) isoviolanthrone (purple) etc. The insulating frame 13 or insulating substrates 14, such as black, and brown, blackish brown, can be obtained by addition of these pigments that what is necessary is just to add according to the color tone difference to need. for example, the black insulating frame 13 or a black insulating substrate 14 — obtaining — red + blue + yellow (= green + red) — then, what is necessary is to be good and just to raise the ratio of red and yellow for making it brown

[0047] A conductor 15 combines the metal powder which consists of metals, such as copper, a silver-copper alloy, gold, etc. by which for example, copper, silver, and a front face were covered with silver, with heat-curing resin, such as an epoxy resin, and changes. wiring — To the metal powder whose particle size is about 0.1–20 micrometers, thermosetting resin precursors, such as epoxy resins, such as the bisphenol A mold epoxy resin, and a bisphenol female mold epoxy resin, a novolak mold epoxy resin, a glycidyl ester mold epoxy resin And it is formed by printing or filling up a predetermined pattern with the metal paste which carried out addition mixing of the curing agents, such as curing agents, such as an amine system curing agent, an imidazole system curing agent, and an acid-anhydride system curing agent, and heating it with the insulating frame 13 and an insulating substrate 14. The operation which connects the electrode of the electronic parts carried to an external electrical circuit electrically is made.

[0048] this wiring — the metal powder contained in a conductor 15 — wiring — although it is what makes the operation which gives conductivity to a conductor 15 — wiring — the content in a conductor 15 — less than 70 % of the weight — wiring — if there is an inclination for the electric resistance of a conductor 15 to become high and it exceeds 95 % of the weight — metal powder — thermosetting resin — firm — joining together — predetermined wiring — it is in the inclination it to become difficult to form a conductor 15. therefore, wiring — as for a conductor 15, what the amount of the metal powder contained in the interior is made into 70 thru/or 95% of the weight of the range for is desirable.

[0049] in addition, wiring — if a conductor 15 is excellent in the corrosion resistance of nickel, gold, etc. on the front face to expose and layer arrival of the metal of right conductivity is carried out to the thickness of 1–20 micrometers with plating — wiring — while being able to prevent the oxidization corrosion of a conductor 15 effectively — wiring — a conductor 15, a bonding wire, and a bump — a conductor can be connected electrically firmly. therefore, wiring — as for a conductor 15, it is desirable to excel in corrosion resistance, such as nickel metallurgy, on the front face to expose, and to carry out layer arrival of the metal of right conductivity to the thickness of 1–20 micrometers with plating.

[0050] and wiring which combined metal powder with the insulating frame and insulating substrate which combined this inorganic insulating material powder with thermosetting resin with thermosetting resin — wiring which consists of the insulating frame and insulating substrate which consist of the above-mentioned ceramic, and a metal also about the package for electronic-parts receipt concerning the manufacture approach of this invention which consists of a conductor — the explanation about the package for electronic-parts receipt which consists of a conductor is applied.

[0051] In the example of the gestalt of the above operation, it faces changing the color tone of the insulating frame 13 and an insulating substrate 14, and is  $L^* a^* b^*$  of the convention of both color difference to JIS-Z -8730. By carrying out to five or more by the color difference by the color coordinate system, recognition of the periphery of the insulating frame 13 by image recognition equipment being still easier and the package for electronic-parts receipt which can be performed to accuracy can be obtained. Therefore, as for the insulating frame 13 and an insulating substrate 14, it is desirable to change a color tone so that it may have such the color

difference.

[0052] In addition, this invention is not limited to the example of the gestalt of above-mentioned operation, and adding modification various in the range which does not deviate from the summary of this invention does not interfere at all. For example, the insulating frame 13 and an insulating substrate 14 are formed from a different ingredient, and you may make it change a color tone.

[0053]

[Effect of the Invention] According to the manufacture approach of the package for electronic-parts receipt of this invention, the laminating of the ceramic green sheet for insulating frames is carried out on the ceramic green sheet for insulating substrates with which the color tones after this and baking differ. To or the layered product which carried out the laminating of the precursor sheet for insulating frames on the precursor sheet for insulating substrates with which the color tones after this and heat curing differ Form a division slot deeper than the thickness of the ceramic green sheet for insulating frames, or the precursor sheet for insulating frames, and it divides to two or more package fields for electronic-parts receipt. From dividing the aggregate of the package for electronic-parts receipt calcinated, or heated and obtained along a division slot, and obtaining two or more packages for electronic-parts receipt According to the package for electronic-parts receipt with which the insulating frame with which the periphery was fabricated by the division slot at accuracy, and with which an insulating substrate differs from a color tone could obtain the package for electronic-parts receipt by which the laminating was carried out to the top face of an insulating substrate, did in this way, and was obtained Even if much weld flash generated by division exists in the side face of the insulating substrate which constitutes an insulating base It becomes accuracy and the thing which can be recognized easily with image recognition equipment about the periphery of the insulating frame with which a color tone differs from such an insulating substrate, consequently the package for electronic-parts receipt which can improve [ precision ] electronic parts alignment and can carry them can be obtained.

[0054] Moreover, according to the manufacture approach of the package for electronic-parts receipt of this invention, it is  $L^* a^* b^*$  of the convention of the color difference of an insulating frame and an insulating substrate to JIS-Z -8730. When it carries out to five or more by the color difference by the color coordinate system, the difference in the color tone of an insulating frame and an insulating substrate can become a much more suitable thing to distinguish easily and recognize with image recognition equipment, and the periphery of an insulating frame can be recognized more easily and certainly.

[0055] About the manufacture approach of the package for electronic-parts receipt which are manufactured by carrying out chocolate breaking from the substrate of picking by the above according to this invention Even if the divided package has weld flash on the side face of a base, the right periphery of a package can be easily recognized to accuracy with image recognition equipment. The manufacture approach of the package for electronic-parts receipt that the package for electronic-parts receipt which can improve [ precision ] electronic parts alignment and can carry them by that cause could be obtained was able to be offered.

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[Translation done.]

\* NOTICES \*

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] (a) - (c) is the sectional view for every production process showing an example of the gestalt of implementation of the manufacture approach of the package for electronic-parts receipt of this invention, respectively.

[Drawing 2] (a) - (c) is the sectional view showing the example of the package for electronic-parts receipt which relates to the manufacture approach of the package for electronic-parts receipt of this invention, respectively.

[Description of Notations]

- 1 ... Ceramic green sheet for insulating frames (precursor sheet for insulating frames)
- 3 ... Ceramic green sheet for insulating substrates (precursor sheet for insulating substrates)
- 4 ... Metallizing paste (metal paste)
- 7 ... Layered product
- 8 ... Division slot
- 10 ... Package field for electronic-parts receipt
- 11 ... Package for electronic-parts receipt
- 13 ... Insulating frame
- 14 ... Insulating substrate
- 15 ... wiring -- a conductor
- 19 ... Electronic parts

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[Translation done.]

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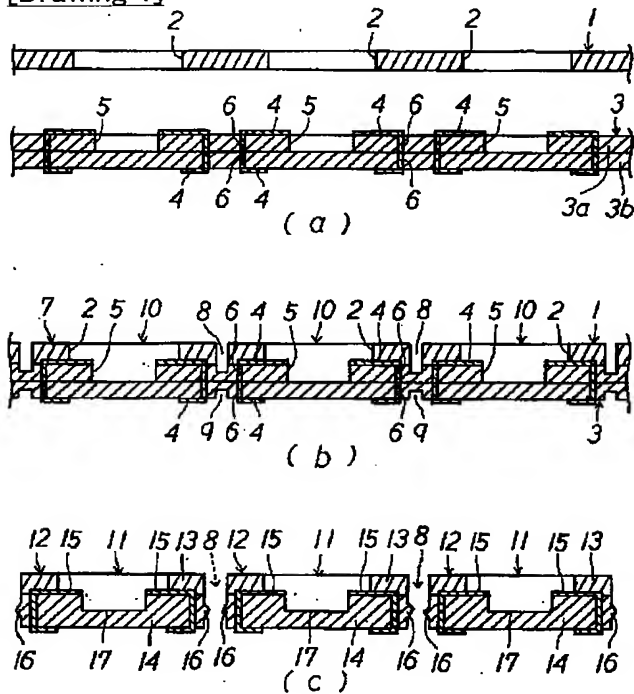
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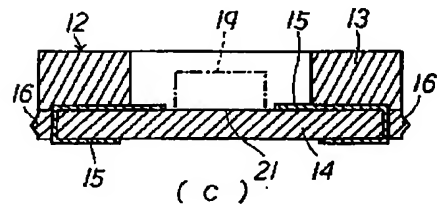
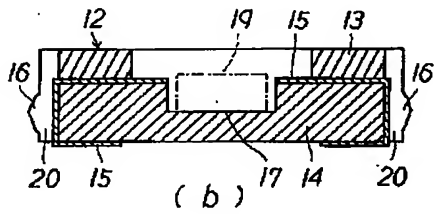
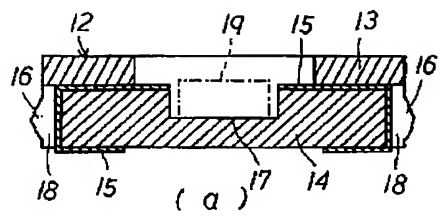
3.In the drawings, any words are not translated.

## DRAWINGS

[Drawing 1]



[Drawing 2]



[Translation done.]

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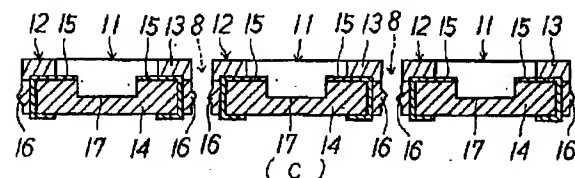
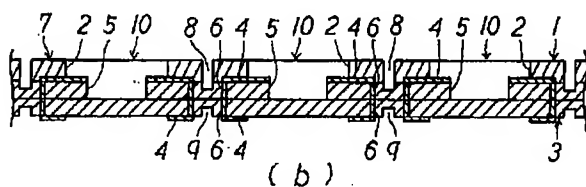
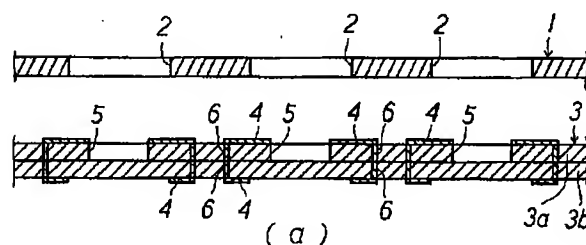
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(54) 【発明の名称】 電子部品収納用パッケージの製造方法

(57) 【要約】

【課題】 多数個取り基板からチョコレートブレイクして得た電子部品収納用パッケージは、外周のバリのために画像認識装置による電子部品の正確な位置決めが困難となっていた。

【解決手段】 絶縁枠体用セラミックグリーンシート1と、そのシート1と焼成後の色調が異なり、配線導体用のメタライズペースト4を印刷した絶縁基板用セラミックグリーンシート3とを準備し、それらを積層して得た積層体7の上面に絶縁枠体用セラミックグリーンシート1の厚みより深い分割溝8を形成して複数の電子部品収納用パッケージ領域10に区画し、この積層体7を焼成後に分割溝に沿って分割して、色調が異なる絶縁枠体13が積層された絶縁基板14に配線導体15が形成された複数の電子部品収納用パッケージ11を得る。絶縁基板12の外周にバリ16が発生しても絶縁枠体13の外周を容易かつ正確に認識できる。





## 【特許請求の範囲】

【請求項1】 セラミックグリーンシートに所定の打ち抜き加工を施して絶縁枠体用セラミックグリーンシートを準備する工程と、該絶縁枠体用セラミックグリーンシートと焼成後の色調が異なるセラミックグリーンシートに金属から成るメタライズペーストを所定パターンに印刷して絶縁基板用セラミックグリーンシートを準備する工程と、前記絶縁枠体用セラミックグリーンシートと前記絶縁基板用セラミックグリーンシートとを上下に積層して積層体を得る工程と、該積層体の上面に前記絶縁枠体用セラミックグリーンシートの厚みより深い分割溝を形成して複数個の電子部品収納用パッケージ領域に区画する工程と、該積層体を焼成して、色調が異なる絶縁枠体が積層された絶縁基板に金属から成る配線導体が形成された電子部品収納用パッケージの集合体を得る工程と、該集合体を前記分割溝に沿って分割して複数個の前記電子部品収納用パッケージを得る工程とを具備することを特徴とする電子部品収納用パッケージの製造方法。

【請求項2】 無機絶縁物粉末と熱硬化性樹脂前駆体とを混合して成る前駆体シートに所定の打ち抜き加工を施して絶縁枠体用前駆体シートを準備する工程と、該絶縁枠体用前駆体シートと熱硬化後の色調が異なる前駆体シートに金属粉末と熱硬化性樹脂前駆体とを混合して成る金属ペーストを所定パターンに印刷して絶縁基板用前駆体シートを準備する工程と、前記絶縁枠体用前駆体シートと前記絶縁基板用前駆体シートとを上下に積層して積層体を得る工程と、該積層体の上面に前記絶縁枠体用前駆体シートの厚みより深い分割溝を形成して複数個の電子部品収納用パッケージ領域に区画する工程と、該積層体を加熱して、色調が異なる絶縁枠体が積層された絶縁基板に前記金属粉末を熱硬化性樹脂により結合した配線導体が形成された電子部品収納用パッケージの集合体を得る工程と、該集合体を前記分割溝に沿って分割して複数個の前記電子部品収納用パッケージを得る工程とを具備することを特徴とする電子部品収納用パッケージの製造方法。

【請求項3】 前記絶縁枠体と前記絶縁基板との色差をJIS-Z-8730に規定のL\* a\* b\* 表色系による色差で5以上とすることを特徴とする請求項1または請求項2記載の電子部品収納用パッケージの製造方法。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は半導体素子や圧電素子・固体撮像素子等の電子部品を収容するための電子部品収納用パッケージに関し、詳しくは多数個取り基板を焼成した後にいわゆるチョコレートブレイクにより個々の基板に分割して得られる電子部品収納用パッケージに関するものである。

## 【0002】

【従来の技術】従来より、半導体集積回路素子等の半導

体素子や圧電素子・固体撮像素子（いわゆるCCD）等の電子部品を収容するための電子部品収納用パッケージについて、例えば外形寸法が約1cm角程度と比較的サイズの小さいパッケージは、その製作に際して、例えばセラミックパッケージであれば、焼成後にパッケージの基板となる広い面積のセラミックグリーンシート積層体に複数個分のパッケージとなる領域を並べて一体的に形成するとともにこの積層体の上面または上下面に各々のパッケージ領域に区画する分割溝を形成しておき、これを焼成して得た複数個のパッケージの集合体を分割溝に沿って分割（いわゆるチョコレートブレイク）することによって、多数個を集約的に製作すること（いわゆる多数個取り）が行なわれている。

【0003】また、基体材料として他のガラスセラミックスや無機絶縁物粉末を有機絶縁性樹脂で結合した絶縁材料等を用いる場合でも、同様に多数個取りのシート状基板からチョコレートブレイクすることによって多数個のパッケージを集約的に製作することが行なわれている。

【0004】一方、このような比較的サイズの小さい電子部品収納用パッケージにおいては、特に固体撮像素子のようにその搭載位置を精度よく管理する必要のある電子部品を搭載する場合、パッケージの基体上面の電子部品搭載部に画像認識装置を用いた自動機等を使用して電子部品を搭載するのに際して、基体上面にはスペースの余裕がないために電子部品を位置合わせする基準となる認識マークを設けることが困難であることから、パッケージの外周を画像認識して位置合わせの基準とし、それに基づいて電子部品を位置決めすることが一般的に行なわれている。

## 【0005】

【発明が解決しようとする課題】しかしながら、上述のように多数個のパッケージを一体的に形成した基板を分割溝に沿ってチョコレートブレイクして得られたパッケージでは、基体の上面の外周は分割溝によって精度よく形成されるものの、分割溝に沿った個々のパッケージの基体の側面には50μm程度の幅のバリが多数発生しやすく、そのため画像認識装置によってパッケージの外周を認識しようとするときバリを含んだ凹凸状の外周として認識してしまうこととなり、その結果、位置合わせの基準であるパッケージの外周を正確に認識することができず、電子部品を搭載部の正しい位置に精度よく搭載することができなくなってしまうという問題点があった。

【0006】このような場合、パッケージ上面の精度よく形成された外周のみに画像認識装置の焦点を合わせてその外周を認識することは、画像認識装置の精度上困難であった。また、分割した後に各々のパッケージの側面を研磨してバリを除去することも、非常に手間と時間がかかって製造工数を増加させてしまい現実的ではなく、基体がセラミックスのように極めて高硬度の材料の場合

には加工技術的にも困難であった。

【0007】本発明は上記問題点を解決すべく案出されたものであり、その目的は、多数個取りの基板からチョコレートブレイクして製作される電子部品収納用パッケージの製造方法について、分割されたパッケージが基体の側面にバリを有していても画像認識装置によってパッケージの正しい外周を容易に正確に認識することができ、それにより電子部品を精度よく位置合わせして搭載することができる電子部品収納用パッケージを得ることができる電子部品収納用パッケージの製造方法を提供することにある。

【0008】

【課題を解決するための手段】本発明の第1の電子部品収納用パッケージの製造方法は、セラミックグリーンシートに所定の打ち抜き加工を施して絶縁枠体用セラミックグリーンシートを準備する工程と、この絶縁枠体用セラミックグリーンシートと焼成後の色調が異なるセラミックグリーンシートに金属から成るメタライズペーストを所定パターンに印刷して絶縁基板用セラミックグリーンシートを準備する工程と、前記絶縁枠体用セラミックグリーンシートと前記絶縁基板用セラミックグリーンシートとを上下に積層して積層体を得る工程と、この積層体の上面に前記絶縁枠体用セラミックグリーンシートの厚みより深い分割溝を形成して複数個の電子部品収納用パッケージ領域に区画する工程と、この積層体を焼成して、色調が異なる絶縁枠体が積層された絶縁基体に金属から成る配線導体が形成された電子部品収納用パッケージの集合体を得る工程と、この集合体を前記分割溝に沿って分割して複数個の前記電子部品収納用パッケージを得る工程とを具備することを特徴とするものである。

【0009】また本発明の第2の電子部品収納用パッケージの製造方法は、無機絶縁物粉末と熱硬化性樹脂前駆体とを混合して成る前駆体シートに所定の打ち抜き加工を施して絶縁枠体用前駆体シートを準備する工程と、この絶縁枠体用前駆体シートと熱硬化後の色調が異なる前駆体シートに金属粉末と熱硬化性樹脂前駆体とを混合して成る金属ペーストを所定パターンに印刷して絶縁基板用前駆体シートを準備する工程と、前記絶縁枠体用前駆体シートと前記絶縁基板用前駆体シートとを上下に積層して積層体を得る工程と、この積層体の上面に前記絶縁枠体用前駆体シートの厚みより深い分割溝を形成して複数個の電子部品収納用パッケージ領域に区画する工程と、この積層体を加熱して、色調が異なる絶縁枠体が積層された絶縁基板に前記金属粉末を熱硬化性樹脂により結合した配線導体が形成された電子部品収納用パッケージの集合体を得る工程と、この集合体を前記分割溝に沿って分割して複数個の前記電子部品収納用パッケージを得る工程とを具備することを特徴とするものである。

【0010】また、本発明の電子部品収納用パッケージの製造方法は、上記第1または第2の製造方法におい

て、前記絶縁枠体と前記絶縁基板との色差をJIS-Z-8730に規定のL\* a\* b\* 表色系による色差で5以上とすることを特徴とするものである。

【0011】本発明の電子部品収納用パッケージの製造方法によれば、絶縁枠体用セラミックグリーンシートをこれと焼成後の色調が異なる絶縁基板用セラミックグリーンシート上に積層し、または絶縁枠体用前駆体シートをこれと熱硬化後の色調が異なる絶縁基板用前駆体シート上に積層した積層体に、絶縁枠体用セラミックグリーンシートまたは絶縁枠体用前駆体シートの厚みより深い分割溝を形成して複数個の電子部品収納用パッケージ領域に区画し、焼成または加熱して得られた電子部品収納用パッケージの集合体を分割溝に沿って分割して複数個の電子部品収納用パッケージを得ることから、分割溝によって外周が正確に成形された、絶縁基板と色調が異なる絶縁枠体が絶縁基板の上面に積層された電子部品収納用パッケージを得ることができ、このようにして得られた電子部品収納用パッケージによれば、絶縁基体を構成する絶縁基板の側面に分割によって発生したバリが多数存在していても、そのような絶縁基板とは色調が異なる絶縁枠体の外周を画像認識装置によって正確かつ容易に認識することができるものとなり、その結果、電子部品を精度よく位置合わせして搭載することができる電子部品収納用パッケージを得ることができる。

【0012】また、本発明の電子部品収納用パッケージの製造方法によれば、絶縁枠体と絶縁基板との色差をJIS-Z-8730に規定のL\* a\* b\* 表色系による色差で5以上とした場合には、絶縁枠体と絶縁基板との色調の差異が画像認識装置によって容易に判別して認識するのに一層好適なものとなり、絶縁枠体の外周をより容易かつ確実に認識することができるものとなる。

【0013】

【発明の実施の形態】次に、本発明を添付の図面に基づき詳細に説明する。図1(a)～(c)は、それぞれ本発明の電子部品収納用パッケージの製造方法の実施の形態の一例を示す製造工程ごとの断面図である。

【0014】まず、本発明の電子部品収納用パッケージの製造方法により、セラミックから成る絶縁基板の上面にその絶縁基板のセラミックと色調が異なるセラミックから成る絶縁枠体が積層され、絶縁基板に金属から成る配線導体が形成された電子部品収納用パッケージを得る場合を説明する。

【0015】この場合は、まず図1(a)に示すように、焼成後に絶縁枠体となるセラミックグリーンシートに所定の打ち抜き加工を施して、内側に電子部品を収容するための開口2を電子部品収納用パッケージ領域に応じて複数個形成した、絶縁枠体用セラミックグリーンシート1を準備する。また、この絶縁枠体用セラミックグリーンシート1と焼成後の色調が異なるセラミックグリーンシートに、焼成後に配線導体となる金属から成るメ

タライズペースト4を電子部品収納用パッケージ領域に  
応じた所定パターンに複数個印刷した、焼成後に絶縁基  
板となる絶縁基板用セラミックグリーンシート3を準備  
する。

【0016】この例では、絶縁基板用セラミックグリー  
ンシート3として、電子部品搭載部を形成するキャビテ  
ィとなる開口5および配線導体としてのビア導体を形成  
する貫通孔6を打ち抜き加工したセラミックグリーンシ  
ート3aと、同様に配線導体としてのビア導体を形成す  
る貫通孔6を打ち抜き加工したセラミックグリーンシ  
ート3bとの2枚のセラミックグリーンシートを積層し、  
貫通孔6にメタライズペースト4を充填するとともにセ  
ラミックグリーンシート3aの上面とセラミックグリー  
ンシート3bの下面とに配線導体のパターンとなるよう  
にメタライズペースト4を印刷している。

【0017】次に、図1(b)に示すように、絶縁枠体  
用セラミックグリーンシート1と絶縁基板用セラミック  
グリーンシート3とを絶縁枠体用セラミックグリーンシ  
ート1を上にして上下に積層して積層体7を得る。その  
後、この積層体7の上面に絶縁枠体用セラミックグリー  
ンシート1の厚みより深い分割溝8を形成して、焼成後  
に各々が電子部品収納用パッケージとなる複数個の電子  
部品収納用パッケージ領域10に区画する。

【0018】このとき、積層体7の下面である絶縁基板  
用セラミックグリーンシート3にも、分割溝8と対向す  
る位置に浅い対向分割溝9を形成しておく、後に分割  
溝8に沿って個々の電子部品収納用パッケージに分割す  
る際に良好に分割することができる。

【0019】このように絶縁枠体用セラミックグリー  
ンシート1の厚みより深い分割溝8を形成することによ  
り、焼成後の絶縁枠体は分割溝8によってその外周が正  
確に精度よく成形されたものとなり、この外周を画像認  
識装置により認識することにより、搭載する電子部品の  
位置合わせの基準に利用することができる。

【0020】次に、図1(c)に示すように、この積層  
体7を焼成して、セラミックから成る絶縁基板14の上面  
にその絶縁基板14のセラミックと色調が異なるセラミ  
ックから成る絶縁枠体13が積層されて成る絶縁基体12に金  
属から成る配線導体15が形成された電子部品収納用パッ  
ケージ11の集合体を得た後、この集合体を分割溝8に沿  
って分割して、複数個の電子部品収納用パッケージ11を  
得る。

【0021】このようにして得られた電子部品収納用パ  
ッケージ11では、絶縁基体12の側面のうち絶縁基板14の  
側面にはチョコレートブレイクにより発生したバリ16が  
多数存在することとなるが、絶縁基板14の上に積層され  
た絶縁枠体13が分割溝8によって正確に成形された外周  
を有しており、絶縁基板13の色調が絶縁基板14と異なる  
ことから、バリ16の存在に影響されることなく絶縁枠体  
13の外周を画像認識装置により容易かつ正確に認識する

ことができ、その外周を位置合わせの基準として電子部  
品を精度よく位置決めして搭載することができるものと  
なる。

【0022】そして、このようにして本発明の製造方法  
により得られた電子部品収納用パッケージ11によれば、  
絶縁基体12の上面のほぼ中央に前述の開口5と開口2と  
により形成された凹部に電子部品の搭載部17が形成さ  
れ、この搭載部17に固体撮像素子等の電子部品(図示せ  
ず)をガラス・樹脂・ろう材等の接着剤を介して搭載固  
定し、絶縁枠体13の上面に蓋体(図示せず)をガラス・  
樹脂・ろう材等の封止材を介して接合して内部に電子部  
品を気密に封止することにより、製品としての電子部品  
装置となる。

【0023】また、本発明の電子部品収納用パッケージ  
の製造方法により製作される電子部品収納用パッケージ  
の他の構成例を、図2(a)~(c)それぞれ断面図で  
示す。これらの図において図1(c)と同様の箇所には  
同じ符号を付してある。

【0024】図2(a)の例は、絶縁基体12として絶縁  
基板14の上に絶縁基板14と色調の異なる絶縁枠体13が積  
層され、絶縁基板14の側面にいわゆるキャスタレーショ  
ン18が形成されており、絶縁基板14に形成された配線導  
体15がこのキャスタレーション18を用いた側面導体を介  
して配線されている例である。そして、絶縁基板14の上  
面に凹部として形成された電子部品の搭載部17に固体撮  
像素子等の電子部品19が搭載され、その上面の電極と搭  
載部17周辺に配置された配線導体15とがボンディングワ  
イヤ(図示せず)等を用いて電氣的に接続される。

【0025】図2(b)の例は、絶縁基体12として絶縁  
基板14の上に絶縁基板14と色調の異なる絶縁枠体13が積  
層され、絶縁枠体13および絶縁基板14の側面の両方にか  
けてキャスタレーション20が形成されており、絶縁基板  
14に形成された配線導体15がこのキャスタレーション20  
を用いた側面導体を介して配線されている例である。

【0026】そして、図2(a)と同様に、絶縁基板14  
の上面に凹部として形成された電子部品の搭載部17に固  
体撮像素子等の電子部品19が搭載され、その上面の電極  
と搭載部17周辺に配置された配線導体15とがボンディン  
グワイヤ(図示せず)等を用いて電氣的に接続される。

【0027】図2(c)の例では、絶縁基体12として絶  
縁基板14の上に絶縁基板14と色調の異なる絶縁枠体13が  
積層され、絶縁基板14には凹部を設けずにその上面のほ  
ぼ中央を電子部品の搭載部21とし、絶縁基板14に形成さ  
れた配線導体15は図1(c)と同様にビア導体を介して  
配線されている例である。そして、絶縁基板14の上面に  
形成された電子部品の搭載部21に固体撮像素子等の電子  
部品19が搭載され、その上面の電極と搭載部21周辺近傍  
に配置された配線導体15とがボンディングワイヤ(図示  
せず)等を用いて電氣的に接続される。また、この例で  
は、搭載部21周辺の配線導体15を搭載部21において電子

部品19の直下の領域まで延在させ、この延在させた先端あるいはその先端に接続された電極パッドに対して、電子部品19の下面に形成された電極をバンプ導体（図示せず）を介して電氣的に接続する、いわゆるフリップチップ実装法により搭載してもよい。

【0028】本発明に係る電子部品収納用パッケージにおいて絶縁基体12を構成する絶縁枠体13および絶縁基板14は、酸化アルミニウム質焼結体・窒化アルミニウム質焼結体・ムライト質焼結体・窒化珪素質焼結体・炭化珪素質焼結等のセラミックスやガラスセラミックス等の電気絶縁材料から成り、絶縁枠体13と絶縁基板14との色調を異ならせるには、セラミック原料に種々の顔料を添加することにより、所望の色調差を得るようにすればよい。

【0029】絶縁枠体13および絶縁基板14の製作に当たっては、例えばセラミックとして酸化アルミニウム質焼結体から成る場合であれば、酸化アルミニウム・酸化珪素・酸化マグネシウム・酸化カルシウム等の原料粉末に適当な有機バインダ・溶剤を添加混合して泥漿状となすとともにこれを従来周知のドクターブレード法によりシート状となすことによりセラミックグリーンシートを得ることにより、これを本発明の電子部品収納用パッケージの製造方法に使用すればよい。

【0030】また、セラミックの色調を異ならせるために顔料を添加する場合は、例えば酸化チタン（焼成後、青黒）や酸化モリブデン（灰～黒）・酸化クロム（ピンク～赤紫）・酸化コバルト（灰）・酸化ニッケル（灰）・エルビア（ピンク）・ネオジア（ブルー）等を必要とする色調差に応じて添加すればよく、これらの顔料の添加により黒色や茶色・茶褐色等のセラミックを得ることができる。

【0031】配線導体15は、タングステン・モリブデン・マンガン・銀・銅等の金属粉末から成るメタライズペーストを所定パターンに印刷あるいは充填して絶縁枠体13および絶縁基板14と共に焼成することにより形成され、搭載される電子部品の電極を外部電気回路に電氣的に接続する作用をなす。

【0032】なお、配線導体15は、タングステンやモリブデンやこれらとマンガンとの合金あるいは銅のメタライズ導体から成る場合、その露出する表面にニッケルや金等の耐食性に優れ、かつ半田との濡れ性に優れる金属をメッキ法により1～20 $\mu$ m程度の厚みに被着させておくと、配線導体15が酸化腐食されるのを有効に防止することができるとともに配線導体15とこれに接続されるボンディングワイヤやバンプ導体との接続を強固なものとなすことができる。従って、配線導体15は、前記のメタライズ導体から成る場合、その露出する表面にニッケルや金等の金属をメッキ法により1～20 $\mu$ mの厚みに被着させておくことが好ましい。

【0033】次に、本発明の電子部品収納用パッケージ

の製造方法により、無機絶縁物粉末を熱硬化性樹脂により結合した絶縁基板の上面にその絶縁基板と色調が異なる、無機絶縁物粉末を熱硬化性樹脂により結合した絶縁枠体が積層され、絶縁基板に金属粉末を熱硬化性樹脂により結合した配線導体が形成された電子部品収納用パッケージを得る場合を、前述の製造方法と同様に図1に基づいて説明する。

【0034】この場合は、まず図1（a）に示すように、加熱して硬化させた後に絶縁枠体となる無機絶縁物粉末と熱硬化性樹脂前駆体とを混合して成る前駆体シートに所定の打ち抜き加工を施して、内側に電子部品を收容するための開口2を電子部品収納用パッケージ領域に応じた複数個形成した絶縁枠体用前駆体シート1を準備する。また、この絶縁枠体用前駆体シート1と加熱後の色調が異なる前駆体シートに、加熱後に配線導体となる金属粉末と熱硬化性樹脂前駆体とを混合して成る金属ペースト4を電子部品収納用パッケージ領域に応じた所定パターンに複数個印刷した、加熱後に絶縁基板となる絶縁基板用前駆体シート3を準備する。

【0035】この例では、絶縁基板用前駆体シート3として、電子部品搭載部を形成するキャビティとなる開口5および配線導体としてのビア導体を形成する貫通孔6を打ち抜き加工した前駆体シート3aと、同様に配線導体としてのビア導体を形成する貫通孔6を打ち抜き加工した前駆体シート3bとの2枚の前駆体シートを積層し、貫通孔6に金属ペースト4を充填するとともに前駆体シート3aの上面と前駆体シート3bの下面とに配線導体のパターンとなるように金属ペースト4を印刷している。

【0036】次に、図1（b）に示すように、絶縁枠体用前駆体シート1と絶縁基板用前駆体シート3とを絶縁枠体用前駆体シート1を上にして上下に積層して積層体7を得る。その後、この積層体7の上面に絶縁枠体用前駆体シート1の厚みより深い分割溝8を形成して、加熱後に各々が電子部品収納用パッケージとなる複数個の電子部品収納用パッケージ領域10に区画する。

【0037】このとき、積層体7の下面である絶縁基板用前駆体シート3にも、分割溝8と対向する位置に浅い対向分割溝9を形成しておく、後に分割溝8に沿って個々の電子部品収納用パッケージに分割する際に良好に分割することができる。

【0038】このように絶縁枠体用前駆体シート1の厚みより深い分割溝8を形成することにより、加熱後の絶縁枠体は分割溝8によってその外周が正確に精度よく成形されたものとなり、この外周を画像認識装置により認識することにより、搭載する電子部品の位置合わせの基準に利用することができる。

【0039】次に、図1（c）に示すように、この積層体7を加熱して、無機絶縁物粉末を熱硬化樹脂で結合した絶縁基板14の上面にその絶縁基板14と色調が異なる、

無機絶縁物粉末を熱硬化樹脂で結合した絶縁枠体13が積層されて成る絶縁基体12に金属粉末を熱硬化樹脂で結合して成る配線導体15が形成された電子部品収納用パッケージ11の集合体を得た後、この集合体を分割溝8に沿って分割して、複数個の電子部品収納用パッケージ11を得る。

【0040】このようにして得られた電子部品収納用パッケージ11では、絶縁基体12の側面のうち絶縁基板14の側面にはチョコレートブレイクにより発生したバリ16が多数存在することとなるが、絶縁基板14の上に積層された絶縁枠体13が分割溝8によって正確に成形された外周を有しており、絶縁基板13の色調が絶縁基板14と異なることから、バリ16の存在に影響されることなく絶縁枠体13の外周を画像認識装置により容易かつ正確に認識することができ、その外周を位置合わせの基準として電子部品を精度よく位置決めして搭載することができるものとなる。

【0041】本発明に係る電子部品収納用パッケージにおいて絶縁基体12を構成する絶縁枠体13および絶縁基板14は、例えば酸化珪素・酸化アルミニウム・窒化アルミニウム・炭化珪素・チタン酸バリウム・チタン酸ストロンチウム・チタン酸カルシウム・酸化チタン・ゼオライト等の無機絶縁物粉末をエポキシ樹脂・ポリイミド樹脂・フェノール樹脂・熱硬化性ポリフェニレンエーテル樹脂・ポリイミドアミド樹脂・ビスマレイミドトリアジン樹脂等の熱硬化性樹脂により結合することによって形成されており、絶縁枠体13と絶縁基板14との色調を異ならせるには、上記の原料に種々の顔料を添加することにより、所望の色調差を得るようにすればよい。

【0042】絶縁枠体13および絶縁基板14は、これらに含有される無機絶縁物粉末の含有量が60重量%未満であると、その熱膨張係数が搭載される電子部品の熱膨張係数に対して大きく相違することとなり、電子部品が作動時に発熱してこの熱が電子部品と特に絶縁基板14の両者に印加されると、両者間に両者の熱膨張係数の相違に起因する大きな熱応力が発生し、この大きな熱応力によって電子部品が絶縁基板14から剥離したり、電子部品に割れや欠けが発生する傾向がある。また無機絶縁物粉末の含有量が95重量%を超えると無機絶縁物粉末を熱硬化樹脂で強固に結合することが困難となる傾向にある。従って、絶縁基体12を構成する絶縁枠体13および絶縁基板14は、その各々の内部に含有される無機絶縁物粉末の量が60乃至95重量%の範囲とすることがこのましい。

【0043】このような絶縁枠体13および絶縁基板14の製作に当たっては、例えば粒径が0.1～100 $\mu$ m程度の酸化珪素粉末にビスフェノールA型エポキシ樹脂・ビスフェノールF型エポキシ樹脂・ノボラック型エポキシ樹脂・グリシジルエステル型エポキシ樹脂等の熱硬化性樹脂前駆体、およびアミン系硬化剤・イミダゾール系硬化剤・酸無水物系硬化剤等の硬化剤を添加混合して得た絶

縁ペーストをドクターブレード法等のシート成形法を採用して半硬化状態のシート状となして前駆体シートを得ることにより、これを本発明の電子部品収納用パッケージの製造方法に使用すればよい。

【0044】また、上記の前駆体シートは、約100～300℃の温度で加熱して熱硬化させることによって、無機絶縁物粉末を熱硬化性樹脂で結合して成る絶縁枠体13および絶縁基板14となる。

【0045】さらに、これら絶縁枠体13および絶縁基板14には、上記の材料にさらにガラス繊維やカーボン繊維・アラミド繊維・アルミナ繊維・チタン酸カリウムウィスカー・ホウ酸アルミニウムウィスカー等の短繊維を配合させてもよい。

【0046】また、これらの色調を異ならせるために顔料を添加する場合は、例えばフタロシアニングリーン（硬化後、緑）・キナクリドンマゼンダ（赤）・チオインジゴ（赤）・フタロシアニンブルー（青）・インダスレン（青）・フラバントロン（黄）・アントラビリジン（黄）・アントアントロン（橙）・ピラントロン（橙）・イソピオラントロン（紫）等を必要とする色調差に応じて添加すればよく、これらの顔料の添加により黒色や茶色・茶褐色等の絶縁枠体13または絶縁基板14を得ることができる。例えば、黒色の絶縁枠体13または絶縁基板14を得るには赤色+青色+黄色（＝緑色+赤色）とすればよく、褐色にするには赤色と黄色の比率を高めればよい。

【0047】配線導体15は、例えば銅・銀・表面が銀で被覆された銅・銀-銅合金・金等の金属から成る金属粉末をエポキシ樹脂等の熱硬化樹脂により結合して成り、粒径が0.1～20 $\mu$ m程度の金属粉末にビスフェノールA型エポキシ樹脂・ビスフェノールF型エポキシ樹脂・ノボラック型エポキシ樹脂・グリシジルエステル型エポキシ樹脂等のエポキシ樹脂等の熱硬化性樹脂前駆体およびアミン系硬化剤・イミダゾール系硬化剤・酸無水物系硬化剤等の硬化剤等の硬化剤を添加混合した金属ペーストを所定パターンに印刷あるいは充填して絶縁枠体13および絶縁基板14と共に加熱することにより形成され、搭載される電子部品の電極を外部電気回路に電気的に接続する作用をなす。

【0048】この配線導体15に含有される金属粉末は、配線導体15に導電性を付与する作用をなすものであるが、配線導体15における含有量が70重量%未満では配線導体15の電気抵抗が高いものとなる傾向があり、また95重量%を超えると金属粉末を熱硬化性樹脂で強固に結合して所定の配線導体15を形成することが困難となる傾向にある。従って、配線導体15は、その内部に含有される金属粉末の量を70乃至95重量%の範囲としておくことが好ましい。

【0049】なお、配線導体15は、その露出する表面にニッケル・金等の耐食性に優れかつ良導電性の金属をメ



ッキ法により1〜20 $\mu$ mの厚みに層着させておくと、配線導体15の酸化腐食を有効に防止することができるとともに配線導体15とボンディングワイヤやバンプ導体とを強固に電氣的に接続させることができる。従って配線導体15は、その露出する表面にニッケルや金等の耐食性に優れかつ良導電性の金属をメッキ法により1〜20 $\mu$ mの厚みに層着させておくことが好ましい。

【0050】そして、この無機絶縁物粉末を熱硬化性樹脂により結合した絶縁枠体および絶縁基板と、金属粉末を熱硬化性樹脂により結合した配線導体とから成る、本発明の製造方法に係る電子部品収納用パッケージについても、前述のセラミックから成る絶縁枠体および絶縁基板と金属から成る配線導体とから成る電子部品収納用パッケージについての説明が適用される。

【0051】以上の実施の形態の例において、絶縁枠体13と絶縁基板14との色調を異ならせるのに際して、両者の色差をJIS-Z-8730に規定のL\* a\* b\* 表色系による色差で5以上とすることにより、画像認識装置による絶縁枠体13の外周の認識がより一層容易かつ正確に行なうことができる電子部品収納用パッケージを得ることができる。従って、絶縁枠体13と絶縁基板14とは、そのような色差を有するように色調を異ならせておくことが好ましい。

【0052】なお、本発明は上述の実施の形態の例に限定されるものではなく、本発明の要旨を逸脱しない範囲で種々の変更を加えることは何ら差し支えない。例えば、絶縁枠体13と絶縁基板14とを異なる材料から形成して色調を異ならせるようにしてもよいものである。

【0053】

【発明の効果】本発明の電子部品収納用パッケージの製造方法によれば、絶縁枠体用セラミックグリーンシートをこれと焼成後の色調が異なる絶縁基板用セラミックグリーンシート上に積層し、または絶縁枠体用前駆体シートをこれと熱硬化後の色調が異なる絶縁基板用前駆体シート上に積層した積層体に、絶縁枠体用セラミックグリーンシートまたは絶縁枠体用前駆体シートの厚みより深い分割溝を形成して複数の電子部品収納用パッケージ領域に区画し、焼成または加熱して得られた電子部品収納用パッケージの集合体を分割溝に沿って分割して複数の電子部品収納用パッケージを得ることから、分割溝によって外周が正確に成形された、絶縁基板と色調が異なる絶縁枠体が絶縁基板の上面に積層された電子部品収納用パッケージを得ることができ、このようにして得られた電子部品収納用パッケージによれば、絶縁基体を構

成する絶縁基板の側面に分割によって発生したバリが多数存在していても、そのような絶縁基板とは色調が異なる絶縁枠体の外周を画像認識装置によって正確かつ容易に認識することができるものとなり、その結果、電子部品を精度よく位置合わせして搭載することができる電子部品収納用パッケージを得ることができる。

【0054】また、本発明の電子部品収納用パッケージの製造方法によれば、絶縁枠体と絶縁基板との色差をJIS-Z-8730に規定のL\* a\* b\* 表色系による色差で5以上とした場合には、絶縁枠体と絶縁基板との色調の差異が画像認識装置によって容易に判別して認識するのに一層好適なものとなり、絶縁枠体の外周をより容易かつ確実に認識することができるものとなる。

【0055】以上により、本発明によれば、多数個取りの基板からチョコレートブレイクして製作される電子部品収納用パッケージの製造方法について、分割されたパッケージが基体の側面にバリを有していても画像認識装置によってパッケージの正しい外周を容易に正確に認識することができ、それにより電子部品を精度よく位置合わせして搭載することができる電子部品収納用パッケージを得ることができる電子部品収納用パッケージの製造方法を提供することができた。

【図面の簡単な説明】

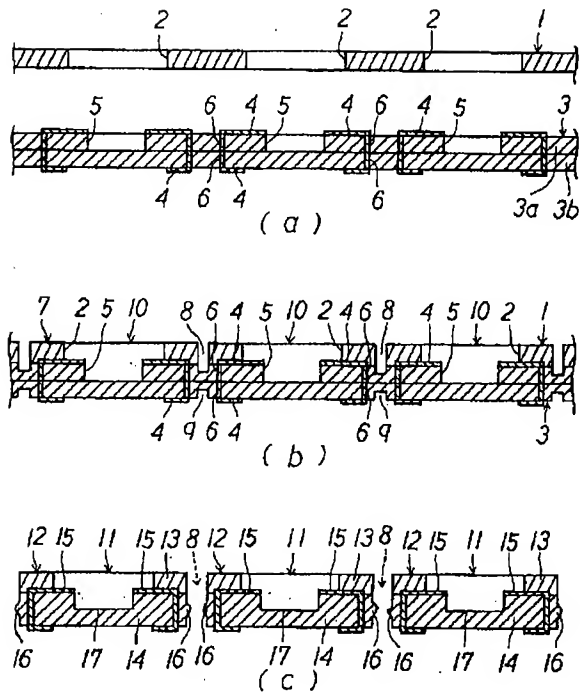
【図1】(a)〜(c)は、それぞれ本発明の電子部品収納用パッケージの製造方法の実施の形態の一例を示す製造工程ごとの断面図である。

【図2】(a)〜(c)は、それぞれ本発明の電子部品収納用パッケージの製造方法に係る電子部品収納用パッケージの例を示す断面図である。

【符号の説明】

- 1・・・絶縁枠体用セラミックグリーンシート（絶縁枠体用前駆体シート）
- 3・・・絶縁基板用セラミックグリーンシート（絶縁基板用前駆体シート）
- 4・・・メタライズペースト（金属ペースト）
- 7・・・積層体
- 8・・・分割溝
- 10・・・電子部品収納用パッケージ領域
- 11・・・電子部品収納用パッケージ
- 13・・・絶縁枠体
- 14・・・絶縁基板
- 15・・・配線導体
- 19・・・電子部品

【図1】



【図2】

